

Application No. 10/720,457
Amendment dated December 18, 2006

Docket No.: 29936/39764

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows.

1. (Currently Amended) A method of forming a device isolation film in a semiconductor device, comprising the steps of:
 - forming an active region on which ions are implanted for controlling a threshold voltage in an NMOS region on a surface of a semiconductor substrate;
 - forming a trench having a side wall to define the active region and a device isolation region by etching a portion of the semiconductor substrate of a device isolation region;
 - forming a side wall oxidation film at the side wall of the trench by performing an oxidation process;
 - performing an ion implantation process ~~on~~ into the active region to compensate for ~~the ions for controlling a threshold voltage, which are diffused from the active region a~~ concentration of the ions implanted for controlling a threshold voltage in the NMOS region; and
 - forming a device isolation film by burying the oxidation film inside the trench.
2. (Previously Presented) The method of claim 1, comprising forming the side wall oxidation film to perform a rounding treatment on an upper portion or a bottom corner of the trench and to increase an adhesive strength of the oxidation film to be buried inside the trench, at the same time, and the film is formed to a thickness in the range of about 50Å to 100Å.
3. (Previously presented) The method of claim 1, comprising performing the oxidation process by a dry oxidation method at a temperature in the range of about 800°C to 950°C.
4. (Previously Presented) The method of claim 1, comprising performing the ion implantation process on an active region after the oxidation process is performed by a dose of 1E 11 ion/cm² to 1E 12 ion/cm² in an energy band of 10 KeV to 25 KeV.

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5. (Previously Presented) The method of claim 1, comprising using boron as an ion that is implanted for controlling the threshold voltage.

6. (Currently Amended) A method of forming a device isolation film in a semiconductor device, comprising the steps of:

forming a screen oxide film on a the semiconductor substrate;

forming an active region on which ions are implanted for controlling a threshold voltage in an NMOS region on the semiconductor substrate;

removing the screen oxide film;

sequentially forming a gate oxide film, a polysilicon film and a pad nitride film on the semiconductor substrate;

forming a trench to define the active region and and a device isolation region by sequentially etching a portion of the pad nitride film, the polysilicon film, the gate oxide film and the semiconductor substrate of the device isolation region;

forming a side wall oxidation film at the side wall of the trench by performing an oxidation process;

performing an ion implantation process ~~on~~ into the active region to compensate for ~~the ions for controlling a threshold voltage, which are diffused from the active region a concentration of the ions implanted for controlling a threshold voltage in the NMOS region;~~

removing the pad nitride film; and

forming a device isolation film by burying the oxidation film inside the trench.

7. (Previously Presented) The method of claim 6, comprising forming the screen oxide film to a thickness in the range of about 50Å to 70Å by a wet oxidation method or a dry oxidation method at a temperature in the range of about 700°C to 900°C.

8. (Previously Presented) The method of claim 6, comprising forming the gate oxide film to a thickness in the range of about 500Å to 700Å by performing an annealing process for 20 minutes to 30 minutes by using N₂ gas at a temperature of about 900°C to 910°C after performing a dry or a wet oxidation process at a temperature of about 750°C to 850°C.

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9. (Previously Presented) The method of claim 6, comprising forming the polysilicon film to a thickness in the range of about 250Å to 500Å by depositing a doped polysilicon film under a pressure of about 0.1 torr to 3 torr in an atmosphere of a PH₃ gas and a Si source gas such as SiH₄ or Si₂H₆ at a temperature of about 500°C to 550°C.

10. (Previously Presented) The method of claim 6, comprising forming the pad nitride film to a thickness of about 900Å to 2000Å by a low pressure chemical vapor deposition method.

11. (Previously Presented) The method of claim 6, comprising forming the side wall oxidation film to perform a rounding treatment on an upper portion or a bottom corner of the trench and to increase an adhesive strength of the oxidation film to be buried inside the trench, at the same time, and forming the film to a thickness in the range of about 50Å to 100Å.

12. (Previously Presented) The method of claim 6, comprising forming the oxidation process by a dry oxidation method at a temperature in the range of about 800°C to 950°C.

13. (Previously Presented) The method of claim 6, comprising performing the ion implantation process on an active region after the oxidation process is performed by a dose of 1E 11 ion/cm² to 1E12 ion/cm² in an energy band of 10 KeV to 25 KeV.

14. (Previously Presented) The method of claim 6, comprising using boron as an ion that is implanted for controlling the threshold voltage.